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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/651,677	08/29/2003	Russell W. Gruhlke	10021105-1	9310

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EXAMINER	
VANNUCCI, JAMES	
ART UNIT	**PAPER NUMBER**
2828	

DATE MAILED: 12/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/651,677	GRUHLKE, RUSSELL W.	
	Examiner	Art Unit	
	Jim Vannucci	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 5 and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Tayebati(6,041,071).

Claim 1, figure 1 discloses a dispersing element(120) operable to disperse a light beam at a wavelength-dependent angle, and a variable index electro-optic element(110) positioned in the path of said light beam including a variable index electro-optic element having an electrically-variable refractive index(col. 12, lines 31-44) such that the variable index electro-optic element is operable to perform wavelength-selective filtering of the light beam dependent on the value of an applied control voltage(V2).

Claims 2 and 17, the variable index electro-optic element(110) disclosed in figure 1 is operable to perform band-pass wavelength filtering(title).

Claim 3, the variable index electro-optic element(110) disclosed in figure 1 is operable to perform wavelength selective filtering by varying the critical angle for total internal optical reflection at an interface of the electro-optic element in response to the applied control voltage since the critical angle is dependent on the index of refraction which can be varied.

Claim 5, the variable index electro-optic element(110) disclosed in figure 1 has an electro-optic material(105).

Claim 16, figure 1 discloses receiving a light beam(35) of wavelength within a range of wavelengths, dispersing(120) the light beam at a wavelength-dependent angle, propagating the light beam through an electro-optic device with an electrically variable refractive index electro-optic element(110), and applying a control voltage(V) to the electro-optic device to cause tunable wavelength filtering dependent on the control voltage.

Claim 18, figure 1 of Tayebati discloses varying the critical angle for total internal reflection at an interface(left wall) of a variable index electro-optic element(120) in response to applying the control voltage, and totally internally reflecting light of a desired wavelength in the light beam at the interface(left wall) in response to varying the critical angle, and partially segregating light of undesired wavelengths in the light beam from the light of the desired wavelength at the interface in response to varying the critical angle.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 6-12, 14-15, 21-25 and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tayebati in view of Sesko et al.(6,205,159).

Tayebati does not disclose a liquid crystal material or an ECL.

Claim 6, figure 2A of Sesko discloses a liquid crystal material variable index electro-optic device(5).

Claim 7, the variable index electro-optic element(5) disclosed in Sesko is a layered structure with a layer of liquid crystal material disposed between layers of dielectric material(col. 11, line 56).

Claim 8, the system disclosed in figure 2A of Sesko constitutes part of an external cavity laser(title) operable to generate a light beam at a single tunable wavelength dependent on the applied control voltage(V), an optical feedback element(9), and an optical gain medium(1) operable to generate the light beam at a wavelength within a range of wavelengths by stimulated emission and disposed to direct the light beam toward the dispersing element(3) and the optical feedback element(10).

Claim 9, the external cavity laser disclosed in figure 2A of Sesko is operable to tune the tunable wavelength by changing the effective optical path length in the variable index electro-optic element(5) dependent on the value of the applied control voltage(V) such that the mode number of the light beam generated in the ECL is electrically tuned(col. 4).

Claim 10, the variable index electro-optic element(5) disclosed in figure 2F of Sesko is disposed between the gain medium(1) and a dispersing element(14).

Claim 11, the external cavity laser disclosed in Tayebati is operable to generate a light beam at a single tunable wavelength by varying the critical angle for total internal optical reflection at an interface of the variable index electro-optic element in response to the value of the applied control voltage.

Claim 12, the optical feedback element(11) includes a retro-reflector, and the variable index electro-optic element(5) is disposed within the ECL between a dispersing element(3) and the retro-reflector(11).

Claim 14, the ECL disclosed in figure 1 of Tayebati has a collimating element(35) disposed between the optical gain medium(10) and the dispersing element(120).

Claim 15, the ECL disclosed in figure 1 of Tayebati has an optical relay element(30) disposed between the optical gain medium(10) and the collimating element(35).

Claim 21, figure 2A of Sesko discloses an external cavity laser(1) having an optical gain medium, a dispersing element, an optical feedback element(9) and a variable index electro-optic element(5).

Claim 22, optical feedback element(11) disclosed in figure 2A of Sesko has a retro-reflector and the light beam is retro-reflected within the ECL through the variable index electro-optic element(5) and a dispersing element(3) to the gain medium(1).

Claim 23, figure 1 of Tayebati discloses varying the effective optical path length through the variable index electro-optic element(110) in response to a variable control voltage(V2) applied to the variable index electro-optic element. Figure 2A of Sesko discloses causing the light beam to oscillate within an ECL at a desired tunable

wavelength(abstract) in response to the varying optical path length such that the mode number of the oscillating light beam within the ECL is electrically tuned.

Claim 24, figure 1 of Tayebati discloses varying the critical angle for TIR at an interface(left side) of a variable index electro-optic element(120) in response to applying a control voltage(V1), totally internally reflecting light of a desired wavelength in the light beam at the interface in response to varying the critical angle, partially segregating light of undesired wavelengths in the light beam from the light of the desired wavelength at the interface in response to varying the critical angle, and causing the light beam within the ECL to oscillate at a desired tunable wavelength in response to the tunable wavelength filtering of the light beam.

Claim 25, figure 2A of Sesko discloses a variable index electro-optic element(5) that is made of a layer of liquid crystal material disposed between layers of dielectric material.

Claim 27, figure 1 of Tayebati discloses emitting a light beam(10), and collimating(35) the emitted light beam prior to dispersing(120).

Claim 28, figure 1 of Tayebati discloses a beam that whose divergence changes from a low divergence value when emitted(30) to a higher divergence value prior to being collimated(35).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the above referenced elements disclosed in Sesko with the device disclosed in Tayebati to obtain a filter with a narrower band width as disclosed in Sesko(abstract).

5. Claims 4 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tayebati in view of Li et al.(6,901,088).

Tayebati does not disclose a second electro-optic device as recited.

Claims 4, figure 6 of Li discloses a first electro-optic element(100) and a second electro-optic element(114) through which the light beam propagates sequentially where the first electro-optic element can be tuned to partially segregate light of undesired wavelengths shorter than a desired wavelength from the light of the desired wavelength at a TIR interface dependent on the value of a first applied control voltage, and the second electro-optic element(114) can be tuned to partially segregate light of undesired wavelengths longer than the desired wavelength from the light of the desired wavelength at a TIR interface dependent on the value of a second applied control voltage.

Claim 19, figure 6 of Li discloses a first variable index electro-optic element(100) and a second variable index electro-optic element(114), applying a first control voltage(112) to the first variable index electro-optic element, applying a second control voltage(116) to the second variable index electro-optic element, propagating a light beam sequentially through the first variable index electro-optic element and the second variable index electro-optic element, tuning partially segregating light of undesired wavelengths shorter than the desired wavelength at a TIR interface of the first variable index electro-optic element in response to applying the first control voltage, and tuning partially segregating light of undesired wavelengths longer than the desired wavelength

at a TIR interface of the second variable index electro-optic element in response to applying the second control voltage.

Claim 20, the first control voltage and the second control voltage disclosed in figure 6 of Li have values independent of one another.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the second electro-optic element disclosed in Li with the device disclosed in Tayebati for tuning the laser as disclosed in Li.

6. Claims 13 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tayebati in view of Sesko as applied above, and further in view of Li.

Tayebati and Sesko do not disclose a second electro-optic device as recited.

Claim 13, figure 6 of Li discloses a first electro-optic element(100) and a second electro-optic element(114) through which the light beam propagates sequentially where the first electro-optic element can perform wavelength selective filtering by varying the critical angle for TIR in response to a first applied control voltage, and the second electro-optic element can perform the selective tuning of the mode number of the generated light beam by changing the effective optical path length in the second electro-optic element in response to a second applied control voltage.

Claim 26, figure 6 of Li discloses a control voltage has a value determined in response to a feedback control signal.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the second electro-optic element disclosed in Li with the device

disclosed in Tayebati and Sesko for tuning the laser as disclosed in Li.

Response to Arguments

7. Applicant's arguments filed October 6, 2005 have been fully considered but they are not persuasive.

8. Applicant argues that element 120 in figure 1 of Tayebati is not a dispersive element. Examiner disagrees.

Dispersion is the separation of light into its wavelength components by diffraction or refraction. Element 120 is a diffractive element; and as such, can also be a dispersive element. Tayebati also discloses that element 120 is a wavelength selection means(col. 7, lines 35-53) that selects and separates a desired wavelength band of light. Since element 120 is a diffraction element that separates a wavelength band of light from an incident light beam, element 120 is a dispersion element.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Correspondence

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Jim Vannucci whose phone number is (571) 272-1820.

Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center whose telephone number is (703) 308-0956.

Papers related to Technology Center 2800 applications only may be submitted to Technology Center 2800 by facsimile transmission. Any transmission not to be considered an official response must be clearly marked "DRAFT". The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Technology Center Fax Center number is (703) 872-9306.

James Vannucci

James Vannucci